

WHAT IS CLAIMED IS:

1. A recombinant nucleic acid molecule comprising a nucleotide sequence encoding a hepatitis C virus nonstructural protein.
2. The recombinant nucleic acid molecule of claim 1 wherein said nonstructural
5 protein is selected from the group consisting of NS3, NS4, and NS5.
3. The recombinant nucleic acid molecule of claim 1 wherein said nucleotide sequence encodes a fusion protein encoding NS3, NS4, or NS5, or any combination thereof.
4. The recombinant nucleic acid molecule of claim 1 wherein said nucleotide
10 sequence encodes a fragment of at least 50 amino acids of nonstructural protein selected from the group consisting of NS3, NS4, and NS5.
5. The recombinant nucleic acid molecule of claim 2 wherein said nucleotide sequence is operably linked to regulatory elements functional in human cells.
6. The recombinant nucleic acid molecule of claim 5 wherein said nucleotide
15 sequence is operably linked to a promoter, enhancer, polyadenylation sequence, and optionally 5' UTR of hepatitis C virus.
7. The recombinant nucleic acid molecule of claim 6 wherein said promoter is a cytomegalovirus promoter and said enhancer is a Rous Sarcoma Virus enhancer.
8. A recombinant host cell comprising a nucleic acid molecule of claim 1.
9. A pharmaceutical composition comprising:
20 a) a recombinant nucleic acid molecule of claim 1 wherein said nucleotide sequence is operably linked to regulatory elements functional in human cells; and
b) a pharmaceutically acceptable carrier or diluent.

10. The pharmaceutical composition of claim 9 wherein said nucleotide sequence encodes a nonstructural protein selected from the group consisting of NS3, NS4, and NS5.
11. The pharmaceutical composition of claim 9 wherein said nucleotide sequence encodes a fusion protein encoding NS3, NS4, or NS5, or any combination thereof.
- 5 12. The pharmaceutical composition of claim 9 wherein said nucleotide sequence encodes a fragment of at least 50 amino acids of nonstructural protein selected from the group consisting of NS3, NS4, and NS5.
13. The pharmaceutical composition of claim 10 wherein said regulatory elements functional in human cells comprise a promoter, enhancer, polyadenylation sequence, and
10 optionally 5' UTR of hepatitis C virus.
14. The pharmaceutical composition of claim 13 wherein said promoter is a cytomegalovirus promoter and said enhancer is a Rous Sarcoma Virus enhancer.
15. The pharmaceutical composition of claim 9 further comprising a facilitator.
16. The pharmaceutical composition of claim 15 wherein said facilitator is
15 bupivacaine.
18. A method of inducing an immune response against hepatitis C virus in a human uninfected by hepatitis C virus comprising administering to said human an amount of at least one recombinant nucleic acid molecule of claim 1 in an amount effective to induce an immune response against hepatitis C virus.
- 20 19. The method of claim 18 wherein said nonstructural protein is selected from the group consisting of NS3, NS4, and NS5.

20. The method of claim 18 wherein said nucleotide sequence encodes a fusion protein encoding NS3, NS4, or NS5, or any combination thereof.
21. The method of claim 18 wherein said nucleotide sequence encodes a fragment of at least 50 amino acids of nonstructural protein selected from the group consisting of NS3,
5 NS4, and NS5.
22. The method of claim 19 wherein said nucleotide sequence is operably linked to regulatory elements functional in human cells.
23. The method of claim 22 wherein said nucleotide sequence is operably linked to a promoter, enhancer, polyadenylation sequence, and optionally 5' UTR of hepatitis C virus.
- 10 24. The method of claim 23 wherein said promoter is a cytomegalovirus promoter and said enhancer is a Rous Sarcoma Virus enhancer.
25. The method of claim 18 wherein said immune response comprises a cellular response.
26. The method of claim 18 wherein said immune response comprises a humoral
15 response.
27. The method of claim 18 wherein said recombinant nucleic acid molecule is in a pharmaceutical composition comprising a pharmaceutically acceptable carrier or diluent.
28. The method of claim 27 wherein said pharmaceutical composition further comprises a facilitator.
- 20 29. The method of claim 28 wherein said facilitator is bupivacaine.

30. A method of immunizing a human susceptible to hepatitis C virus comprising administering to said human an amount of a pharmaceutical composition of claim 9 in an amount effective to induce an immune response.

31. The method of claim 30 wherein bupivacaine is administered to said human at
5 the site of administration of the pharmaceutical composition.

32. A method of immunizing a human susceptible to hepatitis C virus comprising administering to said human an amount of a recombinant nucleic acid molecule of claim 1 in an amount effective to induce an immune response.

33. A method of treating a human who is infected with hepatitis C virus comprising
10 administering to said human an amount of a pharmaceutical composition of claim 9 in an amount effective to induce a therapeutic immune response against hepatitis C virus.

34. The method of claim 33 wherein bupivacaine is administered to said human at the site of administration of the pharmaceutical composition.